NON-PUBLIC?: N
ACCESSION #: 8804270057

LICENSEE EVENT REPORT (LER)

FACILITY NAME: PLANT HATCH, UNIT 2 PAGE: 1 of 10

DOCKET NUMBER: 05000366

TITLE: PROCEDURE DEFICIENCY CAUSES SCRAM AND ONE VALVE FAILS TO CLOSE ON
GROUP 1 ISOLATION
EVENT DATE: 03/18/88 LER #: 88-006-00 REPORT DATE: 04/18/88

OPERATING MODE: 2 POWER LEVEL: 005

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: J. D. Heidt, Nuclear Licensing Manager - Hatch
TELEPHONE #: 404-526-4350

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT: On 03/18/88 at approximately 0920 CST, Unit 2 was in the startup mode of operation at an approximate power level of 172 MWt (approximately 5 percent of rated thermal power). The main turbine was in the tripped condition. Plant personnel were performing a functional test of the turbine control valve fast closure scram instrumentation. The removal of electrical links, to remove the less than 30% power scram bypass feature, resulted in an unplanned scram. Later, one main steam line drain isolation valve (EIIS SB) failed to close on the expected Group 1 signal due to loss of condenser vacuum. The valve did not receive the isolation signal.

The scram was caused by a deficiency in the procedure, which failed to provide proper instructions for performing the functional test. Removing the bypass for both channels at the same time, when the control valve closure signal was present, resulted in the scram. The cause for the valve not receiving the isolation signal could not be determined.

Corrective actions for this event included issuing a procedure revision, investigating the lack of isolation signal to the Group 1 valve, and demonstrating the valve would isolate in response to the Group 1 signal.

(End of Abstract)

A. REQUIREMENT FOR REPORT

This report is required per 10 CFR 50.73 (a)(2)(iv), because an unplanned actuation of the Reactor Protection System (PRS EIIS Code JC) occurred and because an Engineered Safety Feature (ESF) failed to operate as expected. Specifically, one outboard isolation valve in Primary Containment Isolation System (PCIS EIIS Code JM) Group 1 failed to close in response to a planned isolation signal.

B. UNIT(s) STATUS AT TIME OF EVENT

1. Power Level/Operating Mode

Unit 2 was in the startup mode following the unit's seventh refueling outage at an approximate power level of 172 MWt (approximately 5 percent of rated thermal power). Reactor vessel pressure was at approximately 150 psig, and the main turbine was in the "tripped" condition.

2. Inoperable Equipment

There was no inoperable equipment that contributed to this event.

C. DESCRIPTION OF EVENT

1. Event

At approximately 0920 CST on 3/18/88, non-licensed plant instrumentation and Controls (I&C) technicians and licensed Operations personnel were performing surveillance procedure 34SV-C71-005-2S (Turbine Control Valve Fast Closure Instrument Functional Test), Revision 1. This surveillance is required to demonstrate the operability of the turbine control valve fast closure instrumentation, which provides an activation signal for RPS. It is performed prior to reaching the run mode per Technical Specification Section 3.3.1, Table 3.3.1-1, item 10, and Table 4.3.1-1, item 10.

In order to perform this functional test, the scram bypass feature (when less than 30% rated thermal power) must be removed. Procedure 34SV-C71-005-2S, Revision 1, provided for this bypass to be removed by opening electrical link DD-61 in panel 2H11-P609 (RPS channel A) and electrical link DD-61 in panel 2H11-P611 (RPS channel B). However, the procedure did not require that the turbine trip be reset prior to performing these two steps.

With the turbine in the tripped mode, no electrohydraulic control oil pressure was available on the turbine control valves; consequently, the turbine control valve fast closure pressure switches were in the open position. With these pressure switches in the open position, RPS received a full scram signal at 0921 CST when opening the electrical links removed the scram bypass feature of the logic system.

Reactor vessel water level was controlled within its normal range by operations personnel through use of the Feedwater Control System (FCS EIIS SJ). Due to the low power level prior to the scram and the injection of cold Control Rod Drive (CRD EIIS AA) water, reactor pressure decreased in a controlled manner.

At 0940 CST, operations personnel reset the reactor scram. At 1050 CST, the NRC was notified of the actuation of RPS per 10 CFR 50.72 reporting requirements.

At approximately 1115 CST, operations personnel broke the main condenser vacuum because the main turbine steam seal could not be maintained due to low steam pressure. As a result, an expected PCIS Group 1 isolation occurred. All Group 1 valves responded to the isolation signal except the outboard main steam line drain isolation valve 2B21-F019 (EIIS Code SB), which failed to close. Operations personnel immediately closed isolation valve 2B21-F019 with the valve's manual switch (S-5) on panel 2H11-P602.

At 1327 CST, the NRC was notified per 10 CFR 50.72 reporting requirements of the failure of one valve to close in response to the expected Group 1 isolation.

2. Dates/Times

Date Time (CST) Description

3/18/88 0920 I&C personnel and operations personnel were performing surveillance procedure 34SV-C71-005-2S.

0921 A full reactor scram occurred when electrical links were opened to remove the scram bypass feature (when less than 30% rated thermal power). The scram resulted from a turbine control valve fast closure signal since the turbine was in the tripped condition.

0940 The reactor scram was reset.

1050 The NRC was notified of the actuation of RPS per 10 CFR 50.72 reporting requirements.

1115 Upon loss of condenser vacuum, all Group 1 valves isolated (as expected) except isolation valve 2B21-F019. Operations personnel immediately closed the valve with its manual switch (S-5).

1327 The NRC was notified per 10 CFR 50.72 reporting requirements of the failure of one Group 1 valve to close.

3. Other Systems Affected

No safety systems, other than the RPS and PCIS valve Group 1, were affected by this event. These systems have no secondary functions.

4. Method of Discovery

The procedural deficiency was discovered as a result of the reactor scram during performance of the procedure. The failure of Group 1 isolation valve 2B21-F019 to close was discovered during the planned Group 1 isolation when the main condenser vacuum was broken.

5. Operator Actions

Operations personnel performed the following actions:

1. Following the reactor scram, initiated procedure 31EO-EOP-001-2S (Path 2 Flow Chart) to stabilize reactor conditions and proceed with reactor shutdown.

2. Following the expected Group 1 isolation, manually closed valve 2B21-F019 following its failure to close automatically.

3. Initiated an event review team (ERT) investigation per plant administrative guideline AG-MGR-31-0787N.

Nuclear Safety and Compliance (NSC) personnel performed the following action:

1. Participated in the event investigation and reported per 10 CFR 50.73 requirements.

6. Auto/Manual Safety System Response

An unplanned RPS actuation occurred and scrammed the reactor per design. A planned PCIS valve Group 1 isolation actuation occurred where the ESF failed to operate as expected. Specifically, outboard main steam drain line isolation valve, 2B21-F019, failed to isolate so operations personnel manually closed the valve.

D. CAUSE OF EVENT

1. Immediate Cause

The immediate cause of the RPS actuation is the same as the root cause.

The immediate cause of the failure of isolation valve 2B21-F019 to close was determined to be the lack of receipt of the Group 1 isolation signal. Condenser vacuum switches 2B21-N056C and 2B21-N056D are designed to open on low condenser vacuum. When these vacuum switches are opened by low condenser vacuum, an isolation signal circuit is

available to isolate valves 2B21-F019 and 2B31-F020 on a valve Group 1 isolation signal. The ERT determined that neither valve could have received an isolation signal since relays in the circuit that would have opened upon receipt of a Group 1 isolation signal remained closed. Valve 2B31-F020 was already in a closed position so its failure to receive an isolation signal had not been immediately apparent.

2. Root/Intermediate Cause

The root cause of the RPS actuation is a procedural deficiency. Surveillance procedure 34SV-C71-005-2S, Revision O, (Turbine Control Valve Fast Closure Instrument Functional Test) was developed and issued on 4/21/86 for the purpose of meeting the reactor protection instrumentation testing requirements of Unit 2 Technical Specifications Table 3.3.1-1, item 10, notes I and K, and to give the procedure an Operations department number.

The ERT determined that procedure 34SV-C71-005-2S, Revision O (and subsequently, Revision 1), failed to provide the proper procedur
l steps necessary for procedure performance with the turbine in the "tripped" mode. Then plant personnel removed both electrical link DD-61 in panel 2H11-P609 (RPS channel A) and electrical link DD-61 in panel 2H11-P611 (RPS channel B), the "less than 30 percent reactor power" scram bypass feature was removed. Consequently, a full reactor scram occurred on a turbine control valve fast closure signal.

Procedure 34SV-C71-005-2S replaced procedure 57SV-C71-002-2 (Turbine Control Valve Fast Closure Instrument Functional Test). Surveillance procedure 57SV-C71-002-2 was properly written so that the surveillance could have been performed with the turbine in any mode of operation without scramming the reactor.

However, the ERT also determined that Revision 2 of procedure 34SV-C71-005-2S had just become effective on 3/18/88. Revision 2 had been developed by the Procedure Upgrade Program, a long term program to upgrade procedure format and correct any possible procedure deficiencies. Following the scram, the ERT reviewed Revision 2 and determined it was written satisfactorily in that it could be performed in any turbine mode without actuating the RPS

(i.e., if the turbine is in the "tripped" mode each logic channel will be tested separately).

The root cause of the failure of isolation valves 2B21-F019 and 2B31-F020 to receive an isolation signal could not be conclusively identified. Plant technicians completed procedure 57SV-B21-005-2S (Condenser Vacuum Instrument FT&C) at approximately 1500 CST on 3/18/88 and found condenser vacuum switches 2B21-N056C and 2B21-N056D to be within procedure tolerance. Concurrent with the calibration check of the vacuum switches, plant technicians removed the vacuum switch sensing lines and purged them with approximately 25 psig air pressure in the event that debris had accumulated.

Additionally, the isolation root valves, on the vacuum switch sensing lines for condenser vacuum switches 2B21-N056 A, B, C, and D, were disassembled and inspected to assure that the valve discs were securely attached to their respective valve stems. All the discs were found to be securely attached.

At approximately 2155 CST on 3/18/88, operations personnel functionally tested the vacuum switches by unbypassing the condenser low vacuum trip logic system in order to receive a Group 1 valve isolation actuation. An isolation signal was successfully generated for both valves 2B21-F019 and 2B31-F020, and isolation valve 2B21-F019 satisfactorily isolated.

Since the vacuum switches functioned properly after the switch sensing lines were purged, it appears possible that the lines may have been restricted with debris. However, it should be noted that vacuum switches 2B21-N056C and 2B21-N056D had previously tested satisfactorily on 3/9/88 per procedure 57SV-B21-005-2S.

E. ANALYSIS OF EVENT

The turbine control valve fast closure scram signal anticipates the pressure, neutron flux, and heat flux increase that could result from fast closure of the turbine control valves. Fast closure of the turbine control valves, with the reactor at power, can result in a significant addition of positive reactivity to the core as the reactor pressure rise collapses steam voids. The turbine control valve fast closure scram signal initiates a scram earlier than

either the neutron monitoring system or the reactor high pressure scram signals. As an anticipatory signal, this scram provides a greater margin in the limitation of the heat flux of the fuel to acceptable thermal hydraulic limits.

In this specific event, since all systems responded to a valid RPS signal as designed and the reactor was not at a high power level, there were substantial margins to thermal limits.

The main objective of the containment isolation system is to provide protection by preventing releases to the environment of radioactive materials. This is accomplished by complete isolations of system lines penetrating the containment. Redundancy is provided in design aspects to satisfy the requirement that any failure of a single valve or component does not prevent containment isolation. Only one closed valve in each penetration line is necessary to maintain the integrity of the containment.

The PCIS Group 1 isolation signal on a low condenser vacuum condition isolates the main condenser from the primary system. This isolation would be needed if the integrity of the main condenser were compromised. With the main condenser breached, radioactive materials could escape. The low condenser vacuum isolation signal ensures that potential radioactive releases will not occur via this pathway.

In this event, all of the PCIS Group 1 isolation valves except for one were either already closed or functioned correctly in response to a valid isolation signal. The one valve that did no function correctly was backed up by another PCIS Group 1 valve that did close upon receipt of the Group 1 isolation signal. Since the penetration was effectively sealed by the second valve closure, the integrity of the primary containment was ensured. Additionally, plant operations personnel, upon seeing that one valve had not responded to the isolation signal, took prompt corrective action by closing the valve manually.

Based on the above information, it is concluded that this event had no adverse impact on nuclear safety. While this event occurred at a low reactor power level, the above analysis is applicable to all power levels.

F. CORRECTIVE ACTIONS

The corrective actions for this event included:

1. Immediately issuing Revision 2 to procedure 34SV-C71-005-2S to replace the deficient Revision 1.

2. Thoroughly investigating the root cause of valves 2B21-F019 and 2B31-F020 not receiving the isolation signal. This included inspecting the isolation root valves on the condenser vacuum switch sensing lines.

3. Completing a successful functional test of the condenser vacuum switches which provide the low vacuum isolation signal to close valves 2B21-F019 and 2B31-F020 and purging the vacuum switch sensing lines.

4. Demonstrating successfully that valve 2B21-F019 would isolate in response to a Group 1 signal.

G. ADDITIONAL INFORMATION

1. FAILED COMPONENT(s) IDENTIFICATION

Although valve 2B21-F019 failed to respond correctly in response to a PCIS Group 1 isolation signal in this event, after a thorough investigation no actual failed component could be identified. Additionally, when the valve was subjected to another Group 1 isolation signal, it responded correctly.

2. PREVIOUS SIMILAR EVENTS

There has been one previous event where valves 2B21-F019 and 2B31-F020 failed to respond correctly to a PCIS Group 1 isolation due to low condenser vacuum. This was reported by LER 50-366/1987-007 (dated 7/28/87).

This LER described an event where a root valve's (RV-1) disc had become disconnected, due to normal valve wear, from its stem and blocked the condenser vacuum line between the main condenser and vacuum switches 2B21-N056C and 2B21-N056D. The corrective action taken was to replace the bonnet, stem, and valve disc of root valve RV-1.

Since this previous event had an identifiable cause (root

valve failure) which did not exist in the event described in LER 50-366/1988-006, the associated corrective action could not have prevented occurrence of that event.

ATTACHMENT # 1 TO ANO # 8804270057 PAGE: 1 of 2

Georgia Power Company Georgia Power
333 Piedmont Avenue the southern electric system
Atlanta, Georgia 30308
Telephone 404 526-6526

Mailing Address
Post Office Box 4545
Atlanta, Georgia 30302

L. T. Gucwa
Manager Nuclear Safety
and Licensing
SL-4537
0212I
X7GJ17-H310

April 18, 1988

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555

PLANT HATCH - UNIT 2
NRC DOCKET 50-366
OPERATING LICENSE NPF-5
LICENSEE EVENT REPORT
PROCEDURE DEFICIENCY CAUSES SCRAM AND
ONE VALVE FAILS TO CLOSE ON GROUP 1 ISOLATION

Gentlemen:

In accordance with the requirements of 10 CFR 50.73(a)(2)(iv), Georgia Power Company is submitting the enclosed Licensee Event Report (LER) concerning the unanticipated actuation of some Engineered Safety Features (ESFs). The event occurred at Plant Hatch - Unit 2.

Sincerely,

/s/ L. T. Gucwa
L. T. Gucwa

CLT/lc
Enclosure: LER 50-366/1988-006
c: (see next page)

ATTACHMENT # 1 TO ANO # 8804270057 PAGE: 2 of 2

U. S. Nuclear Regulatory Commission
April 18, 1988
Page Two

c: Georgia Power Company
Mr. J. T. Beckham, Jr., Vice President - Plant Hatch
GO-NORMS

U. S. Nuclear Regulatory Commission, Washington, D. C.
Mr. L. P. Crocker, Licensing Project Manager - Hatch

U. S. Nuclear Regulatory Commission, Region II
Dr. J. N. Grace, Regional Administrator
Mr. P. Holmes-Ray, Senior Resident Inspector - Hatch

0212I

*** END OF DOCUMENT ***